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ABSTRACT

This report documents the development of three major products: (1) a Los Angeles County Dual Independent Map Encoding (DIME) File to which community college district boundaries have been special area coded; (2) a book-like listing of all house number ranges and street names and the college district and census tract they are found in; and (3) a bound map-atlas of census blocks and census tracts on which the current boundaries of community college districts in Los Angeles County are traced. The use of the DIME File and appropriate computer software to review the addresses of student applicants and determine whether they reside in the college district is discussed. Appendixes provide an example of Census Tract and Census Block Coding, an Example Coding Sheet, Copies of Corresponsence, and a Street Spelling Standardization Form. (DB)

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SPECIAL AREA CODING COMMUNITY COLLEGE DISTRICT BOUNDARIES ON THE LOS ANGELES COUNTY DIME FILE

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COMMUNITY COLLEGE DATA BASE TEAM

October 1974

This report was prepared under the auspices of the Los Angeles Community College District, Office of Educational Research and Analysis: Dr. Arthur N. Cherdack, Director; and in cooperation with the Office of Inter-District Relations, Mr. Powell Fredericks, Director.

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SPECIAL AREA CODING COMMUNITY COLLEGE DISTRICT BOUNDARIES ON THE LOS ANGELES COUNTY DIME FILE

The Los Angeles Community College District has been involved in building a DIME file based geographic information system since the summer of 1972. This project was undertaken to develop a tool for college planners and administrators to use in responding in a systematic and direct manner to community needs.

The Community College Data Base Team was formed to aid in the development of this system. Their first effort resulted in an interim July 1973 report entitled, Student Residence Locations and Associated Census Data. This report served two research oriented purposes: (1) to provide data about the geographic distribution of disadvantaged citizens within the District and Los Angeles County; and (2) to provide data about the geographic distribution of students attending each of the District's colleges.

In July 1974, the Team reported on their efforts to create a "mini-census" of data items taken from student application forms. That report demonstrated how internally generated student data could be aggregated for comparison with external census data. The project documentation was

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titled, Student Residence Locations and Associated Enrollment Data.

INTRODUCTION

The Los Angeles County DIME file (Dual Independent Map Encoding) is basically a computer readable urban map. That is, characteristics on a map, such as street intersections and street address ranges have been recorded onto computer tape. Also included in this map or geographic base file are so-called "geographic codes". These are always such codes as census tract and census block and may include special area codes such as community planning areas or college district boundaries. These geographic codes are provided for each street covered by the geographic base file. DIME is simply a method for producing such a file.

A DIME geographic base file can be used with any local data records that are in computer form (cards or tape) and that have house addresses on the individual records. A DIME file provides the base for assigning geographic codes to local data records, such as college district of residence to individual student application forms. This is accomplished by using an address matching computer program (ADMATCH) that transfers special geographic codes from DIME files to data records containing street addresses.

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This means that data can be aggregated to any geographic area desired, if that area identifier has been coded into the DIME file. Thus the Los Angeles Community College District could use a computer process to check all student application forms to determine if the residence shown was within the District; and if it was shown to be out, determine what district said residence was in, providing that the area identifiers had been coded into the County DIME file for each of the college districts.

Additionally the number of students from within and without the District could be reported as census tract aggregates. These data could then be compared to census data at the tract level, and more importantly to other local data also aggregated to the census tract level. The potential of this system to aid in negotiating inter-district aggrements was recognized and the decision was then made to add community college district boundary codes to the Los Angeles County DIME file.

The completion of this project would result in three major products:

(1) A Los Angeles County DIME file to which community college district boundaries had been special area coded.

(2) A book-like listing of all house number ranges and street names and the college district and census tract they were to be found in.

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(3) A bound map-atlas of census blocks and and census tracts on which the current boundaries of community college districts in Los Angeles County had been traced.

This report documents the development of those products.

MAPPING DISTRICT BOUNDARIES

The first area of work undertaken was drawing the districts' boundaries onto a set of Metropolitan Map Series (MMS) census maps. This was a necessary first step in translating the districts' geographical areas into a DIME-useable format. The DIME file's index of street names and address ranges shares the same organizational structure as the Metropolitan Map Series. A street segment is identified by the MMS map, census tract, and census block in which it occurs. The process of building a computer index of all street names and address ranges within college districts is largely a process of building a listing of the district's area in terms of the MMS census tract and census block format.

The census map set used was the Los Angeles-Long Beach Urbanized Area (U.S. Department of Commerce, Series HC(3), #18). The set consists of 63 map sheets, a visual index page, and an index by census tract numbers. The maps, at a scale of 1 inch = 2000 feet, show census tract and block boundaries superimposed on the street, political, and major

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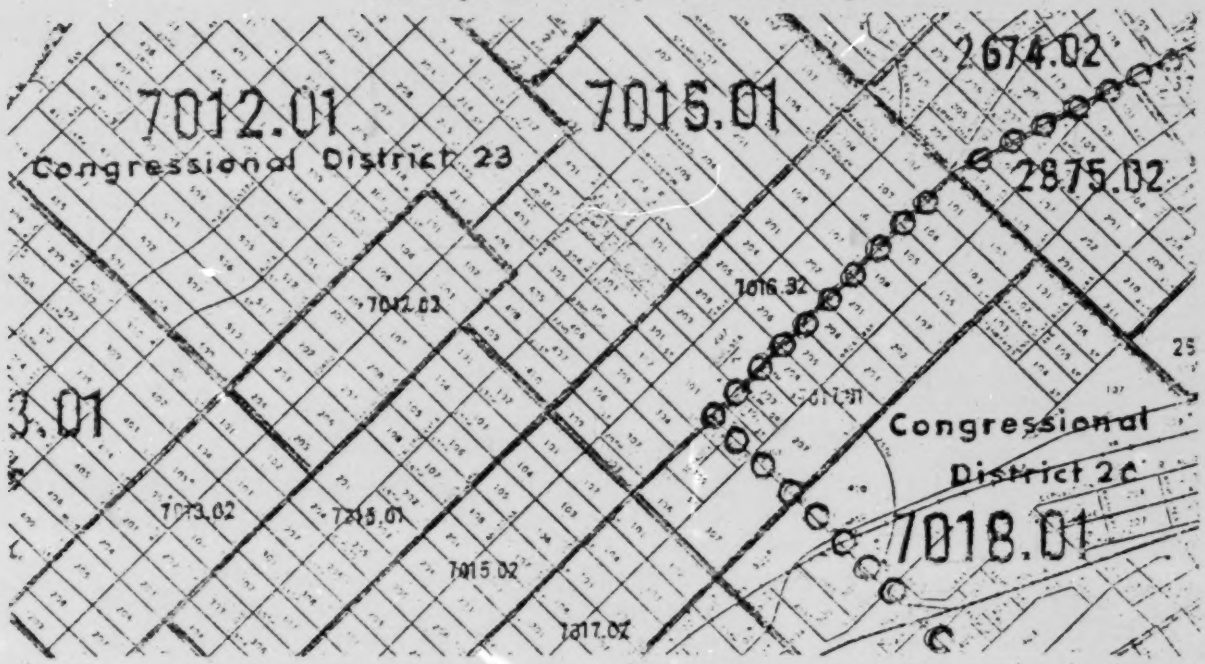
non-street features of the area. Figure 1. Census tract

Figure 1.

Metropolitan Map Series Sample



borders and numbers appear in heavy green, and the census block numbers are shown in a smaller black type. Each census tract is uniquely numbered, and subdivided into a number of component block groups and blocks.

The master source used for drawing the college district boundary onto the MMS maps was a 795 page set of Los Angeles County voter precinct maps. This mapset had been prepared by the Los Angeles County Engineer Special District Map Department and had all community college district boundaries

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in the County represented in heavy red ink. The precinct map set is updated regularly, and shows in great detail the street and major non-street features of all areas within Los Angeles County. Having been prepared by the County Engineer, the map set with the community college district boundaries served as an official interpretation of the statutory definitions of the various districts.

Working map by map the Data Base Team located the different district boundaries on the precinct maps. The corresponding area was located on an MMS map, and the boundary was sketched in pencil. When all boundaries had been sketched and checked, and all districts had been labelled, the MMS map set was taken to a draftsperson and the penciled boundaries were copied in ink. Once drafted, the set was then bound in atlas form.

Despite the differences in scale and focus of detail between the two map sets, the boundary translation was accomplished with 98% accuracy. Although the MMS map set did not have as great a measure of detail as the precinct maps, accuracy of border translation was not affected appreciably, since the boundaries generally followed street or major non-street features in urbanized areas.

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CODING ORGANIZATION

Once the community college district borders had been drawn on the MMS maps, work was ready to begin on the listing of all the districts' area in a DIME-useable format. Creation of the listing in a DIME-useable format required that all areas be accounted for on one of three levels.

The three levels were: the census tract, the census block, and street segment. Since listing areas in terms of each successive level became increasingly time consuming and difficult, all areas were listed in the simplest possible terms. The majority of any district's area could be listed in terms of complete census tracts; the majority of the remaining area could be listed in terms of complete census blocks; and for only the Los Angeles Community College District and its immediate neighbors was the remaining area dealt with in terms of individual street segments.

The starting point for this portion of the project was an existing list of the 958 census tracts which were either totally or partially in the Los Angeles Community College District. At the beginning the list was in the form of a 958 card deck of IBM cards. Each card represented one census tract. The following format explains how the data was coded. Figure 2. illustrates the physical layout of the data on each card.

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Card Format

columns 1-4 — Place Code. The place code consists of a four digit number which represents either a unique city or unincorporated territory in which the census tract occurs.

columns 6-10 — Place Name. The place name is a five letter abbreviation for the city in which the census tract occurs. Tracts occuring in unincorporated areas are represented by the abbreviation UNINC.

columns 12-17 — Census Tract Number.

columns 19-21 — District Percentage. This represents the percentage of the census tract which occurs within the Los Angeles Community College District.

Figure 2.—

Sample Listing of District Census Tract Card Deck

```
0010 ALHAM 480300 100
0010 ALHAM 480400 100
0010 ALHAM 480801 100
0010 ALHAM 480802 100
0010 ALHAM 480900 100
0010 ALHAM 481001 100
0010 ALHAM 481500 100
0010 ALHAM 481601 100
0010 ALHAM 481602 100
0010 ALHAM 481800 100
0010 ALHAM 481901 100
0010 ALHAM 481902 100
0070 BELL  532301 100
0070 BELL  533600 100
0070 BELL  533801 100
0070 BELL  533802 100
0090 BELLG 533900 100
0090 BELLG 534000 100
0090 BELLG 534100 100
0090 BELLG 534200 100
0100 BFVLY 700100 100
```

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The IBM cards were listed in computer printout form, (as shown in Figure 2.), and checked against the MMS maps for accuracy. This list became the master list used in the process of coding the District area in terms of census tracts and census blocks, and street segments.

A coding format was created for listing in-District census tracts and census blocks in a DIME-useable format. Utilizing general purpose eighty column keypunch forms, the format was as follows: (see illustration in Appendix A for example of census tract and census block coding).

Coding Format

columns 1-2	Card Type. "2C" in the first two columns indicated that the card represented a complete census block. "2G" in the first two columns indicated that the card represented a complete census tract.
columns 3-8	Census Tract Number. Used on both block and tract cards.
columns 19-21	Census Block Number. Columns 19-21 were left blank on card type 2G.
columns 31-36	District Code. When system was expanded to encode districts other than Los Angeles, a unique six digit number was assigned to each community college district in Los Angeles County.

The district codes assigned to the various community college districts in Los Angeles County are shown in Figure 3.

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Figure 3.

Assigned Community College District Codes

000100	Los Angeles
000200	Long Beach
000300	Pasadena
000400	El Camino
000500	Mt San Antonio
000600	Cerritos
000700	Rio Hondo
000800	Citrus
000900	Glendale
001000	Compton
001100	Santa Monica
001200	Non-District

The codes were assigned in descending order by enrollment size, with Los Angeles having the greatestenrollment, and Santa Monica having the smallest.

CODING PROCESS

The first step in the coding process began with the 958 IBM cards which represented all census tracts either totally or partially in the District. Working with the modified MMS maps, cards representing all census tracts which touched the District boundary were manually separated from the main deck and set aside. The remaining cards represented non-border census tracts which were entirely within the District and were entered in a computer program to produce an output deck in DIME-useable format.

All border tracts were then checked against the MMS maps.

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Those which were entirely within the District were manually coded as such (card type 2G) and punched into card form. At this point, all District area which could be coded in terms of complete census tracts had been coded.

The next step was to list as much of the remaining area as possible in terms of complete census blocks. Since in most cases the District boundary ran along existing block boundaries, the block level listing was able to account for most of the area which had not been covered in the tract level listing. Again working from the modified MMS maps, all census blocks which had not been accounted for in the tract level listing and which were entirely in the District were listed, coded (card type 2C) and punched into card form.

At this point all District area which could be coded in terms of either complete census tracts or complete census blocks had been coded. A small portion of the District had not been accounted for. There were a number of census blocks which were only partially in the District. Figure 4 is a map showing one such instance of split block 105 of census tract 2628.

On July 25, 1974 a briefing was attended by Data Base Team staff at the Southern California Regional Information Study (SCRIS) offices in the Los Angeles County Hall of

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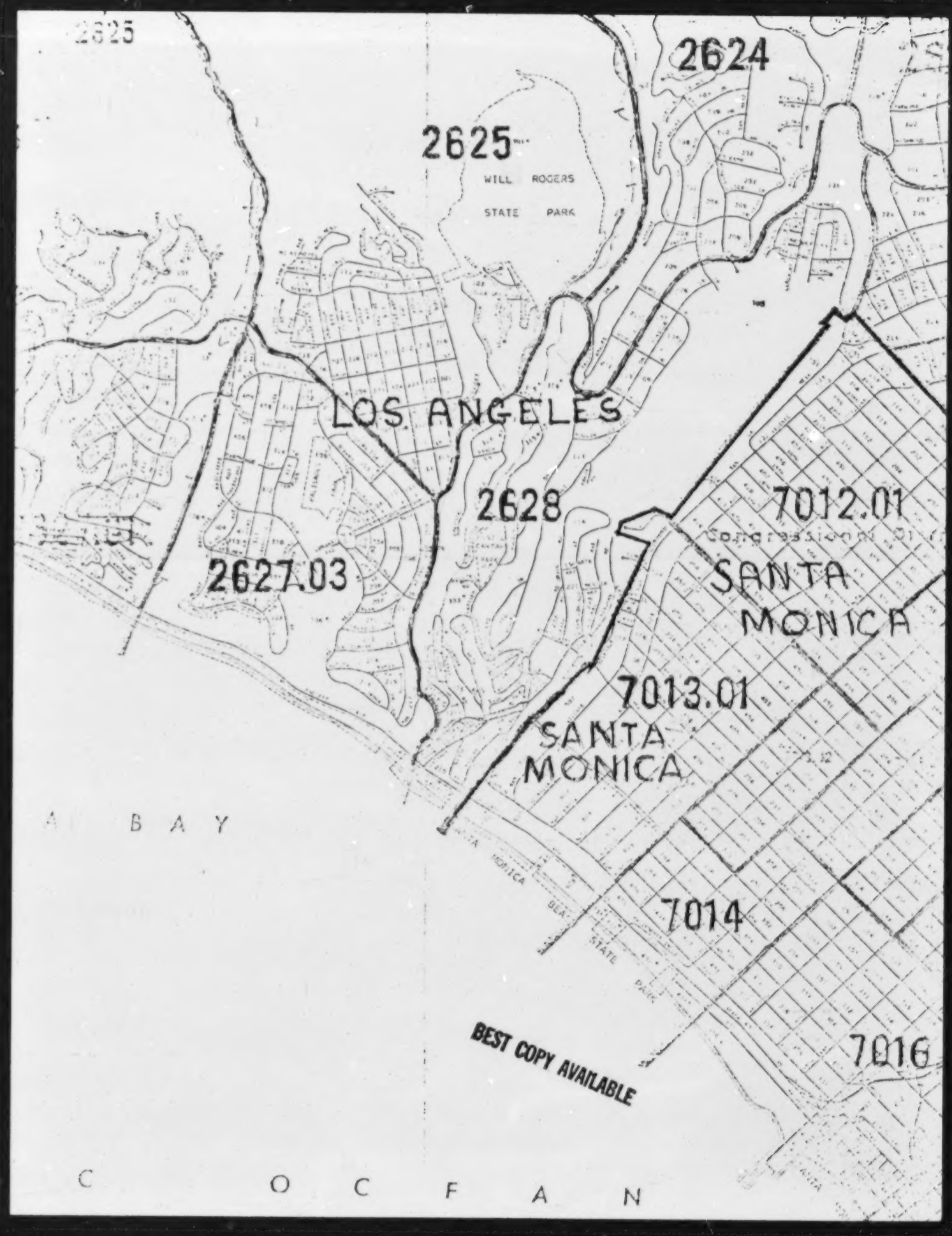
Figure 4.

Map Showing Split Block 105 of Census Tract 2628


2625
2624
2625
WILL ROGERS
STATE PARK
LOS ANGELES
2628
7012.01
SANTA
MONICA
2627.03
7013.01
SANTA
MONICA
BAY
7014
7016
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Records with Mr. Forrest Key, Project Head, concerning street segment coding procedure. The purpose of the meeting was to explain the process by which individual street segments could be listed in a DIME-useable format. Such a listing would account for the remaining portion of the District which occured in split census blocks.

The main source for the information necessary in the segment coding procedure was the SCRIS set of Los Angeles County mylar masters for the MMS series maps. These maps were an enlarged version of the MMS paper prints onto which the Data Base Team had traced college district boundaries. The enlargements are printed on translucent mylar.

The feature on the SCRIS mylar maps which was critical to the segment coding process was the presence of "node numbers". Node numbers are numbered dots placed along streets, census blocks and census tract boundaries, and major non-street features in such a way that street and census block and tract boundary segments can be identified in terms of what two nodes they are between.

All segment coding was done in an existing format used by SCRIS in the DIME file updating process. The format of the coding forms was as shown:

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Segment Coding Format

columns 1-2	Card Type. "2A" in all cases identifies this as a segment transaction.
columns 3-8	Census Tract Number and Suffix. In cases where census tract had no suffix, suffix was coded a '00'.
columns 9-12	"from node". First of the two node numbers used to identify the segment.
columns 13-15	"from map". MMS map on which "from node" occurs.
columns 18-21	"to node". Second node in identifying pair.
columns 22-24	"to map". MMS map on which "to node" occurs.
column 27	Segment Side Identification. L indicates that only left side of identified segment was being coded, R indicated right side, and B, both sides.
columns 38-39	Sequence Number. "01" in all cases.

Working from the paper MMS map set that showed the community college district boundaries, a split block was identified, and then located on the corresponding mylar MMS map. Those street segments which were in the District were identified on the paper MMS map, and then located on the mylar map. Segments were then listed one by one on the card type 2 coding form, and the coding forms were punced into card form.

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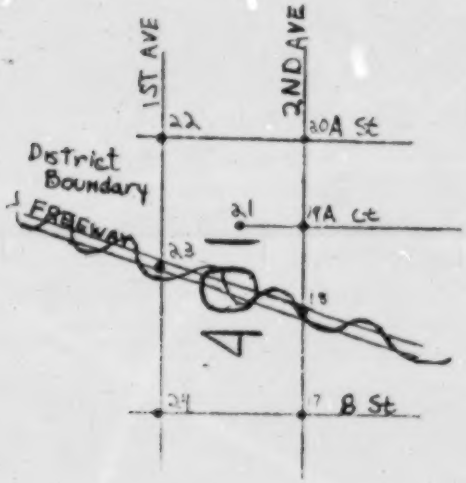
Figure 5 is a sketch map showing an example of a hypothetical census block number 401 which would require segment coding. Suppose this block occurs in census tract 1000.00, on MMS map number 100.

Figure 5.

Sketch Map of Hypothetical Split Block 401



In this case the District boundary line runs along the freeway. The portion of the 401 block occuring above the freeway is in the District, that portion which occurs below it is not. The in-District street segments of block 401 are coded as shown on the example coding sheet in Appendix B.

BOUNDARY INTERPRETATION PROBLEM

One problem in the interpretation of the County Engineer's boundary lines on the voter precinct maps occured.

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In some instances, when the District boundary ran along a street, the line was drawn down the centerline; in other instances the line appeared on one curb or the other. The question was raised as to whether or not houses on opposite sides of the street were still in different districts in instances where the boundary line was not drawn down the centerline of the street. Correspondence with the Los Angeles County Engineer Special Districts Department clarified the question, and the course was followed to treat boundaries on street sidelines exactly the same as boundaries drawn on the street centerlines. Copies of correspondence documenting this decision are shown in Appendix C.

SPLIT SEGMENT CODING

Many times street segment coding was not sufficient for an exact description of District area in split census blocks. In those instances street segments were bisected by the District boundary. To maximize accuracy, those segments were neither coded as entirely within or outside of the District. Instead, they were coded as two new segments. The procedure used in this was that advanced by the Census Bureau in its UPDIME documentation. The assignment of new node numbers was coordinated with the SCRIS operation. However, it should be pointed out that the creation of those special

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segments rendered the District DIME file unique from the County file. Thus update procedures for the District file can be carried on in concert with those of the County but the two files will remain independent from one another.

STREET SPELLING STANDARDIZATION

Work on the street spelling standardization was also done in cooperation with SCRIS. This activity was undertaken to minimize the number of records that would appear in the final street address index guide as well as to increase the accuracy of the DIME file and reduce it in size. This activity also had the side benefit of shortening the number of alternate spelling cards carried in the ADMATCH program tables.

The types of errors encountered involved different spellings for streets of the same names or in other cases records with same street names were spelled correctly, but street type and direction designation were incorrect. By eliminating such mistakes the number of possible mismatches was reduced and the accuracy of the address edit was increased.

In doing this work a computer printout was produced listing all street names, directions, and types as were currently listed in the County DIME file. Using a Thomas

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Brothers Map Guide and a street listing prepared by the Los Angeles County Registrar of voters, each record was checked for correct spelling and spacing, correct street direction and correct street type. Records which were incorrect or not in the standardized format were corrected on a SCRIS Street Spelling Standardization Form, (see Appendix D.).

The street listing as it currently appeared was entered on the left hand side of the form, and the corrected version was entered on the right hand side. In all, approximately 2000 transactions were made and that resulted in about 6000 corrections being made to the file

APPROXIMATE CODING OF BOUNDARIES OTHER THAN THE LA DISTRICT

At this point the first priority items of the project had been completed: drawing in of all district boundaries in the County on the MMS maps; coding the Los Angeles Community College District boundary onto the County DIME file with maximum accuracy; and street spelling standardization had been completed. The decision was then made to proceed with the gross coding of all other community college district boundaries in Los Angeles County.

The procedure was similar to that used in coding the Los Angeles Community College District boundary. Again working with the MMS map set which had been modified to show all district boundaries, one district at a time was coded, first at the census tract level and then at the block level. Due

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to project limitations of time and resources, segment coding was not undertaken. Census blocks which occured in more than one district were inspected to determine which district contained the greater number of people within its portion and the whole block was then assigned to it.

CONCLUSIONS

The Community College Data Base Team has completed the major undertaking of modifying the Los Angeles County DIME file to precisely indicate those portions of the urban street network within its boundary, and to a lesser degree those portions within the boundaries of other districts in the County. Using this file and approriate computer software it will now be possible to automatically review the addresses associated with student applications to determine if students live in or out of the District. If students are judged to live out of the District, this file will give some indication as to what district he lives in.

Presently the inspection of student applications, for reasons of economics, must be done in one pass, or "batch-mode". However, discussions are underway to determine the need for making the decision about in or out of District residence in a real time or "on-line mode". Should the need for such a system become evident, a consortium of County colleges may provide a means of defraying system development costs and enhancing system efficiency.

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APPENDIX A

Example of Census Tract and Census Block Coding

GENERAL PURPOSE CARD PUNCHING FORM — PUNCHING INSTRUCTIONS

PROGRAM | DATE | WRITTEN AS | PUNCH AS | PAGE | OF

NOTES:

1–10	11–20	21–30	31–40	41–50	51–60	61–70	71–80
2G651301			000400				
2G651302			000400				
2A277400		301	000400				
		302					
		303					
		304					
2A277400		305	000400				

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APPENDIX B

Example Coding Sheet

5/72

LOCAL AREA CODES CHANGES
CARD TYPE 2

TYPE	TRAN	TRACT BASIC	TRACT SX	FROM BLOCK NODE	FROM BLOCK SX	FROM MAP	FROM SEC	TO BLOCK NODE	TO BLOCK SX	TO MAP	TO SEC	LR	SQ	LOCAL FIELDS (DEFINE LOCALLY) 31-40	41-50	51-60	61-70	71-80
1	2	A	100000	017		100		018		100		L	01					
2				018				019				L	01					
3				019				020				L	01					
4				019				021				B	01					
5				020				022				L	01					
6	2	A	100000	023		100		022		100		R	01					
7																		
8																		
9																		
0																		
1																		
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3																		
4																		
5																		
6																		
7																		
8																		
9																		
0																		

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APPENDIX C

Copies of Correspondence

Los Angeles Community Colleges

Administrative Offices: 2140 West Olympic Boulevard, Suite 310, Los Angeles, California 90006 • (213) 380-6000

Leslie Koltai, Chancellor

BOARD OF TRUSTEES
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KENNETH S. WASHINGTON, Ph.D.
FREDERIC A. WYATT

July 17, 1974

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Mr. Maurice Lloyd
Special District Map Department
Los Angeles County Engineer
108 West Second Street
Los Angeles, California 90012

Dear Mr. Lloyd:

The Los Angeles Community College District is in the process of building a computer index of all street names and address ranges within the district. To this end it has been necessary to use the precinct maps provided by your office.

We would appreciate your judgment concerning a problem that has arisen in the interpretation of the College District boundary. In an instance where the boundary is drawn down the side, rather than in the middle, of a street, are the houses on opposite sides of the street still in different districts? Attached is a sketch of such an instance, taken from precinct map number 608 in the City of Inglewood.

Thank you for your time and cooperation.

Very truly yours,

Powell L. Fredericks

POWELL L. FREDERICKS
Interdistrict Coordinator

PLF:PK:eo
Attach.

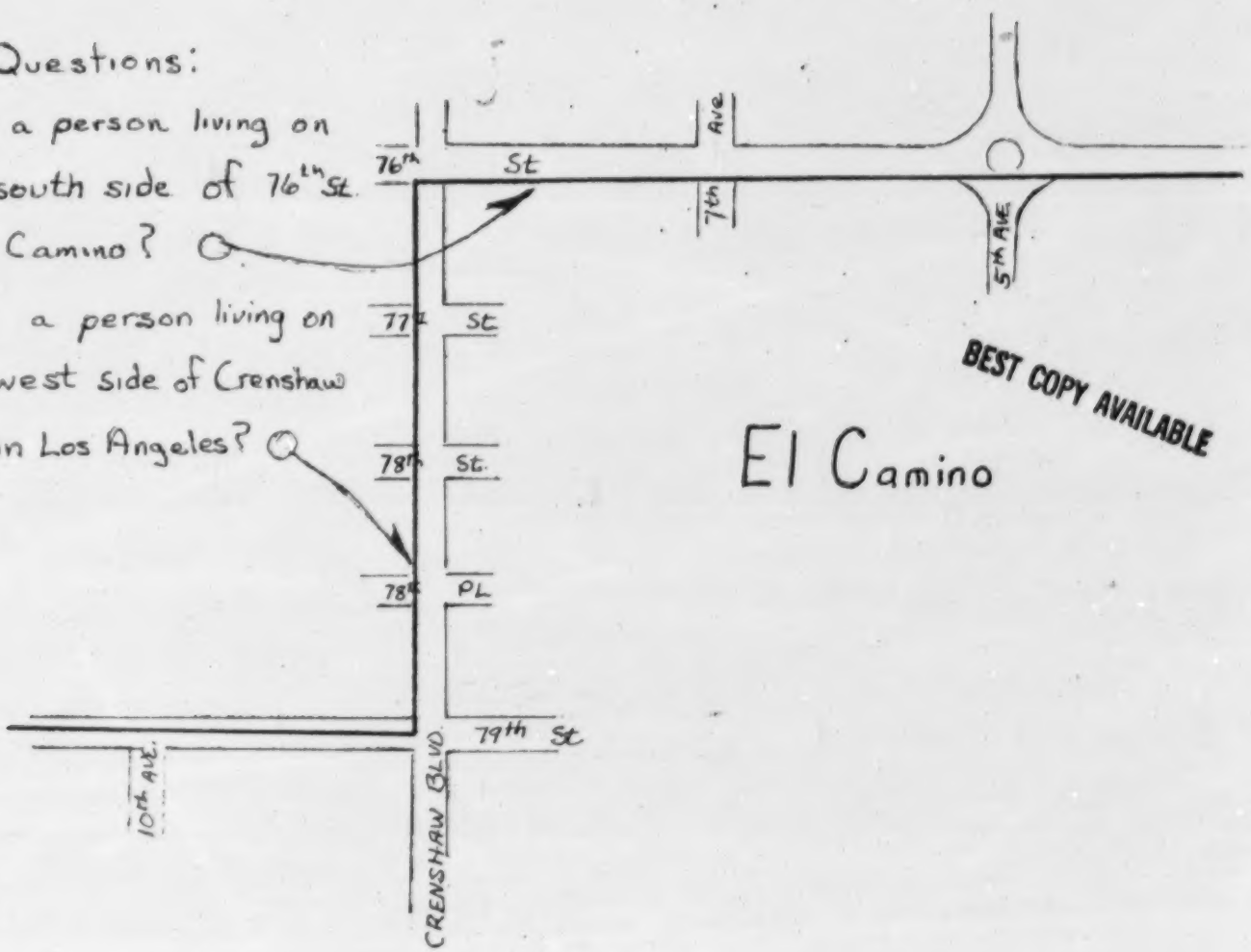
cc: Mr. Paul Kinney (Landini Project)

Los Angeles

Questions:

1. Is a person living on the south side of 76th St. in El Camino?

2. Is a person living on the west side of Crenshaw Blvd in Los Angeles?



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(from precinct map no. 608, in City of Inglewood)

HARVEY T. BRANDT
COUNTY ENGINEER
ROBERT A. WILLIAMS
CHIEF DEPUTY

COUNTY OF LOS ANGELES

DEPARTMENT OF COUNTY ENGINEER
MAPPING DIVISION
108 WEST SECOND STREET
LOS ANGELES, CALIFORNIA 90012
974-7020

JOHN E. MAULDING
DIVISION ENGINEER
GEORGE E. BARR
ASSISTANT
GIBSON PHELPS JR.
ASSISTANT

July 29, 1974

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Mr. Powell L. Fredericks
Interdistrict Coordinator
Los Angeles Community Colleges

Dear Mr. Fredericks:

COMMUNITY COLLEGE DISTRICT
BOUNDARIES--CLARIFICATION

This is in reply to your letter of July 19, 1974, requesting clarification of the school district boundaries as shown on precinct maps prepared by the County Engineer.

The boundaries of the community college districts, as you know, follow the boundaries of the component high school districts, or unified districts, which in turn are described originally as the boundaries of the component elementary districts. Many of these boundary descriptions are quite old and follow lot lines and boundaries difficult to relocate under present development. The County Engineer is prohibited by California statutes from making substantial changes in these boundaries without district approval. However, over the years, minor relocations of district boundaries have been made, in consultation with the effected districts, in the great majority of cases where boundaries cut through lots in subdivisions.

In preparing the set of precinct maps showing the community college districts, care was taken to show the boundaries as accurately as possible considering scale restrictions, and therefore, some are shown on street sidelines. In all cases, school boundaries on street sidelines should be treated exactly as if the boundaries were on the centerline, and houses on opposite sides of the street would be in different community college districts. We hope that this will help clarify the situation for you.

Very truly yours,

Harvey T. Brandt
COUNTY ENGINEER

George E. Barr

George E. Barr
Assistant Division Engineer

GEB:FRD-vs 9

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APPENDIX D

Street Spelling Standardization Form

UNIVERSITY OF CALIF.
LOS ANGELES

NOV 13 1974

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION

County of Los Angeles
Data Processing Dept.

GENERAL PURPOSE CARD PUNCHING FORM

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JOB	
BY	DATE

PUNCHING INSTRUCTIONS

WRITTEN AS:													
PUNCH AS:													

NOTES:

STREET SPELLING STANDARDIZATION CODING FORM

FIELD IDENTIFICATION — OLD — NEW

| | OLD | | | | | | | | | | | | | | | | | | | | NEW | | | | | | | | | | | | | | | | | | |